

WHAT IS CLAIMED IS:

- 1 1. A computer-implement method for generating a document editor,
2 comprising:
3 (a) generating one or more class specifications in the computer from a schema
4 for the document, wherein the class specifications identify user interface components
5 of the editor corresponding to entities defined in the schema; and
6 (b) instantiating one or more objects in the computer from the class
7 specifications to invoke the editor.
- 1 2. The method of claim 1 above, wherein the documents are eXtensible
2 Markup Language (XML) documents and the schemas are XML schemas.
- 1 3. The method of claim 2 above, wherein the schemas are selected from a
2 group including Document Type Definition (DTD) schemas, Document Content
3 Definition (DCD) schemas, and XSchema schemas.
- 1 4. The method of claim 1 above, wherein the class specifications comprise
2 Java class specifications.

1 5. The method of claim 1 above, wherein the generating step further
2 comprises converting an entity defined in the schema into the class specification.

1 6. The method of claim 1 above, wherein the generating step further
2 comprises the step of generating the class specifications in the computer from the
3 schemas and one or more optional customization specifications.

1 7. The method of claim 6 above, wherein the optional customization
2 specifications define what class names to generate for each entity defined in the
3 schema.

1 8. The method of claim 1 above, wherein the class specifications include
2 one or more specifications selected from a group comprising (1) a visual editor class
3 specification, (2) a content implementation class specification, and a handler class
4 specification.

1 9. The method of claim 1 above, further comprising mapping the entities
2 defined in the schema to components of the editor.

- 1 10. The method of claim 1 above, wherein the entities are selected from a
2 group comprising elements and attributes of elements.
- 1 11. The method of claim 10 above, wherein the attribute has a declaration
2 selected from a group comprising mandatory, optional, and fixed value.
- 1 12. The method of claim 11 above, further comprising accepting user input
2 for attributes having a mandatory declaration.
- 1 13. The method of claim 11 above, further comprising accepting user input
2 for attributes having an optional declaration.
- 1 14. The method of claim 11 above, further comprising entering values
2 from the schema for attributes having a fixed value declaration.
- 1 15. The method of claim 10 above, further comprising validating values
2 entered for the attribute.
- 1 16. The method of claim 1 above, wherein the class specifications include
2 at least one function for validating at least one entity defined in the schema.

1 17. The method of claim 1 above, wherein the generating step further
2 comprises the step of generating the class specifications from a regular expression
3 language comprising one or more declarations of elements enclosed within an
4 element.

1 18. The method of claim 17 above, wherein the regular expression
2 language includes one or more regular expression operators selected from a group
3 comprising:

- 4 (1) a "zero or more" operator,
- 5 (2) a "one or more" operator,
- 6 (3) a "one or the other" operator,
- 7 (4) a "one followed by the other" operator,
- 8 (5) a "zero or one" operator,
- 9 (6) a "grouping" operator, and
- 10 (7) an "any" operator.

1 19. The method of claim 18 above, wherein the class specifications define
2 one or more widgets that are associated with each of the operators.

1 20. The method of claim 1 above, wherein the class specifications define at
2 least one widget associated with an entity in the schema.

1 21. The method of claim 1 above, further comprising identifying specific
2 widget implementations for use with the editor.

1 22. The method of claim 1 above, further comprising customizing the
2 editor for use with different regular expression operators.

1 23. The method of claim 1 above, further comprising attempting to solve
2 correctness, optimization, or aesthetics related issues when generating the visual
3 editor from the schema.

1 24. A computer-implemented apparatus for generating a document editor,
2 comprising:

3 (a) a computer; and

4 (b) an editor maker, executed by the computer, for generating one or more
5 class specifications in the computer from a schema for the document, wherein the
6 class specifications identify user interface components of the editor corresponding to
7 entities defined in the schema, and for instantiating one or more objects in the
8 computer from the class specifications to invoke the editor.

1 25. The apparatus of claim 24 above, wherein the documents are
2 eXtensible Markup Language (XML) documents and the schemas are XML schemas.

1 26. The apparatus of claim 25 above, wherein the schemas are selected
2 from a group including Document Type Definition (DTD) schemas, Document
3 Content Definition (DCD) schemas, and XSchema schemas.

1 27. The apparatus of claim 24 above, wherein the class specifications
2 comprise Java class specifications.

1 28. The apparatus of claim 24 above, wherein the means for generating
2 further comprises means for converting an entity defined in the schema into the class
3 specification.

1 29. The apparatus of claim 24 above, wherein the means for generating
2 further comprises means for generating the class specifications in the computer from
3 the schemas and one or more optional customization specifications.

1 30. The apparatus of claim 29 above, wherein the optional customization
2 specifications define what class names to generate for each entity defined in the
3 schema.

1 31. The apparatus of claim 24 above, wherein the class specifications
2 include one or more specifications selected from a group comprising (1) a visual
3 editor class specification, (2) a content implementation class specification, and a
4 handler class specification.

1 32. The apparatus of claim 24 above, further comprising means for
2 mapping the entities defined in the schema to components of the editor.

1 33. The apparatus of claim 24 above, wherein the entities are selected from
2 a group comprising elements and attributes of elements.

1 34. The apparatus of claim 33 above, wherein the attribute has a
2 declaration selected from a group comprising mandatory, optional, and fixed value.

1 35. The apparatus of claim 34 above, further comprising means for
2 accepting user input for attributes having a mandatory declaration.

1 36. The apparatus of claim 34 above, further comprising means for
2 accepting user input for attributes having an optional declaration.

1 37. The apparatus of claim 34 above, further comprising means for
2 entering values from the schema for attributes having a fixed value declaration.

1 38. The apparatus of claim 33 above, further comprising means for
2 validating values entered for the attribute.

1 39. The apparatus of claim 24 above, wherein the class specifications
2 include at least one function for validating at least one entity defined in the schema.

1 40. The apparatus of claim 24 above, wherein the means for generating
2 further comprises means for generating the class specifications from a regular
3 expression language comprising one or more declarations of elements enclosed within
4 an element.

1 41. The apparatus of claim 40 above, wherein the regular expression
2 language includes one or more regular expression operators selected from a group
3 comprising:

- 4 (1) a "zero or more" operator,
5 (2) a "one or more" operator,
6 (3) a "one or the other" operator,
7 (4) a "one followed by the other" operator,
8 (5) a "zero or one" operator,
9 (6) a "grouping" operator, and
10 (7) an "any" operator.

1 42. The apparatus of claim 41 above, wherein the class specifications define
2 one or more widgets that are associated with each of the operators.

1 43. The apparatus of claim 24 above, wherein the class specifications define
2 at least one widget associated with an entity in the schema.

1 44. The apparatus of claim 24 above, further comprising means for
2 identifying specific widget implementations for use with the editor.

1 45. The apparatus of claim 24 above, further comprising means for
2 customizing the editor for use with different regular expression operators.

1 46. The apparatus of claim 24 above, further comprising means for
2 attempting to solve correctness, optimization, or aesthetics related issues when
3 generating the visual editor from the schema.

1 47. An article of manufacture embodying logic for performing a method
2 for generating a document editor for use in an object-oriented computer system, the
3 method comprising the steps of:

4 (a) generating one or more class specifications from a schema for the
5 document, wherein the class specifications identify user interface components of the
6 editor corresponding to entities defined in the schema; and

7 (b) instantiating one or more objects from the class specifications to invoke
8 the editor.

1 48. The method of claim 47 above, wherein the documents are eXtensible
2 Markup Language (XML) documents and the schemas are XML schemas.

1 49. The method of claim 48 above, wherein the schemas are selected from
2 a group including Document Type Definition (DTD) schemas, Document Content
3 Definition (DCD) schemas, and XSchema schemas.

1 50. The method of claim 47 above, wherein the class specifications
2 comprise Java class specifications.

1 51. The method of claim 47 above, wherein the generating step further
2 comprises converting an entity defined in the schema into the class specification.

1 52. The method of claim 47 above, wherein the generating step further
2 comprises the step of generating the class specifications in the computer from the
3 schemas and one or more optional customization specifications.

1 53. The method of claim 52 above, wherein the optional customization
2 specifications define what class names to generate for each entity defined in the
3 schema.

1 54. The method of claim 47 above, wherein the class specifications include
2 one or more specifications selected from a group comprising (1) a visual editor class
3 specification, (2) a content implementation class specification, and a handler class
4 specification.

1 55. The method of claim 47 above, further comprising mapping the
2 entities defined in the schema to components of the editor.

1 56. The method of claim 47 above, wherein the entities are selected from a
2 group comprising elements and attributes of elements.

1 57. The method of claim 56 above, wherein the attribute has a declaration
2 selected from a group comprising mandatory, optional, and fixed value.

1 58. The method of claim 57 above, further comprising accepting user input
2 for attributes having a mandatory declaration.

1 59. The method of claim 57 above, further comprising accepting user input
2 for attributes having an optional declaration.

1 60. The method of claim 57 above, further comprising entering values
2 from the schema for attributes having a fixed value declaration.

1 61. The method of claim 56 above, further comprising validating values
2 entered for the attribute.

1 62. The method of claim 47 above, wherein the class specifications include
2 at least one function for validating at least one entity defined in the schema.

1 63. The method of claim 47 above, wherein the generating step further
2 comprises the step of generating the class specifications from a regular expression
3 language comprising one or more declarations of elements enclosed within an
4 element.

1 64. The method of claim 63 above, wherein the regular expression
2 language includes one or more regular expression operators selected from a group
3 comprising:

- 4 (1) a "zero or more" operator,
5 (2) a "one or more" operator,
6 (3) a "one or the other" operator,
7 (4) a "one followed by the other" operator,
8 (5) a "zero or one" operator,
9 (6) a "grouping" operator, and
10 (7) an "any" operator.

1 65. The method of claim 64 above, wherein the class specifications define
2 one or more widgets that are associated with each of the operators.

1 66. The method of claim 47 above, wherein the class specifications define
2 at least one widget associated with an entity in the schema.

1 67. The method of claim 47 above, further comprising identifying specific
2 widget implementations for use with the editor.

1 68. The method of claim 47 above, further comprising customizing the
2 editor for use with different regular expression operators.

1 69. The method of claim 47 above, further comprising attempting to solve
2 correctness, optimization, or aesthetics related issues when generating the visual
3 editor from the schema.